

REMARKS

Claims 1, 2, 4-14 and 16-24 are pending in the application.

Claims 1, 2, 4-14 and 16-24 have been rejected.

Claims 1 and 13 have been amended.

Unless otherwise specified in the below discussion, Applicants have amended the above-referenced claims in order to provide clarity or to correct informalities in the claims. Applicants further submit that, unless discussed below, these amendments are not intended to narrow the scope of the claims. By these amendments, Applicants do not concede that the cited art is prior to any invention now or previously claimed. Applicants further reserve the right to pursue the original versions of the claims in the future, for example, in a continuing application.

Rejection of Claims Under 35 U.S.C. §103

Claims 1-2, 4-14 and 16-24 stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 6,405,284 issued to Bridge (“Bridge”), U.S. Patent No. 5,819,310 issued to Vishlitzky et al. (“Vishlitzky”), and U.S. Patent Application Publication No. 2003/0074528 naming Soejima et al. as inventors (“Soejima”). Applicants respectfully traverse these rejections.

In order for a claim to be rendered invalid under 35 U.S.C. §103, the subject matter of the claim as a whole would have to be obvious to a person of ordinary skill in the art at the time the invention was made. *See* 35 U.S.C. §103(a). This requires: (1) the reference(s) must teach or suggest all of the claim limitations; (2) there must be some

teaching, suggestion or motivation to combine references either in the references themselves or in the knowledge of the art; and (3) there must be a reasonable expectation of success. *See* MPEP 2143; MPEP 2143.03; *In re Rouffet*, 149 F.3d 1350, 1355-56 (Fed. Cir. 1998).

Independent Claims 1 and 13, as amended, each contain limitations of substantially the following form:

in response to a request to perform a plurality of operations on a plurality of logical volumes,

identifying a first storage region of a plurality of storage regions available for allocation for a first operation of the plurality of operations on a first logical volume of the plurality of logical volumes,

determining whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes using one or more subsets of the plurality of storage regions, wherein

the one or more subsets exclude the identified first storage region, and

allocating the first storage region for the first operation, after performing said identifying and said determining, if said determining determines that each of the remaining operations can be performed.

See, e.g., Claim 1 (amended). Applicants respectfully submit that neither Bridge nor Vishlitzky nor Soejima, alone or in combination, provides disclosure of these limitations.

The independent claims have been amended to further clarify that the “identifying” and “determining” limitations occur prior to allocation of the first storage region for the first operation, and that the operation claimed by the “identifying” limitation occurs prior to the operation claimed by the “determining” limitation. Further, the “allocating” limitation only occurs if the “determining” limitation determines that each of the remaining operations can be performed. *See also* Application, Figure 3 (elements 302, 306, 308, 311, 312 and 314) and Application, ¶¶ [0036]-[0037]

(establishing that an evaluation of the remaining physical regions is performed prior to actually allocating the space for the first selected operation).

Applicants respectfully submit that the cited sections of Bridge disclose an allocation of the disclosed primary extent occurs first and then an evaluation of free space to handle the mirror partners occurs after the allocation. *See, e.g.,* Bridge, Fig. 11.

Referring now to FIG. 11, the following actions are performed to accomplish the allocation:

1. Find a disk drive for the primary extent of the parity extent set (1102) and allocate parity extent on selected disk drive (1104). In an embodiment, a round robin algorithm is used to evenly spread extents across disk drives.
2. Allocate data extents on full mirror partners of the disk drive containing the parity extent (1106 and 1108). Each data extent should be in a different failure group. To limit exposure to multiple disk failures, mirror only partners should not be used for parity protected data. The selected full mirror partners should have available free space to allocate the data extents. If sufficient full mirror partners cannot be found (1108), then deallocate the primary extent (1107) and go back to 1102 to select a different disk drive for the primary parity extent.

Bridge 19:38-54 (cited by Office Action, p.3). Thus, Bridge's primary parity extent must be allocated first and then Bridge provides for a purported evaluation of space for the full mirror partners. *Id.* If the full mirror partners cannot be found, then the primary parity extent is deallocated and the selection for the primary parity extent is re-performed. *Id.*

Therefore, the cited section of Bridge cannot disclose the amended independent claims because Bridge requires allocation of the primary parity extent (equated by the Office Action to the claimed first operation) prior to a determination of availability of space for the mirror partners (equated by the Office Action to the claimed remaining operations). *See* Office Action, p.3. In fact, Bridge cannot function without first performing the allocation of the primary parity extent. The cited section requires the allocation of the primary parity extent before any other space analysis is performed. *See*

also Bridge, Figure 11 (element 1102 ["Select disk for primary extent"] and element 1104 ["Allocate primary extent allocation units"] occurring before element 1106 ["Find sufficient full mirror partners?"]); Bridge 14:65-15:1 ("A parity set is allocated by picking any disk drive as the primary disk to hold the parity extent and then allocating the data extents on its mirror partners."). This is because Bridge requires the information about the allocated primary extent in order to identify Bridge's mirror partners. As stated in Bridge 19:50-54, the mirror partners must be in a different failure group than that of the primary extent. *See also* Bridge 14:21-27; Bridge 14:39-44 ("Mirror partners should be chosen to be in as many different failure groups as possible. When allocating extents with mirroring or parity protection, sets of extents are preferably allocated using mirror partners. The allocation begins by picking any disk drive in the disk group and allocating one extent on that disk drive. The extent is the primary extent in the extent set.") (emphasis added). Therefore, Bridge can only anticipate, at best, allocation of the primary extent first and then if there is not sufficient space to allocate the remaining extents, then to deallocate the primary extent and to select a different drive for the primary extent. *See* Bridge 15:36-49. Bridge will simply not function without at least the disclosed initial allocation of the primary extent. Thus, the cited section of Bridge clearly teaches away from the claimed limitations.

Further, Bridge describes a system in which Bridge's data extents are allocated on the full mirror partners, but if sufficient space cannot be found then a deallocation occurs and the process begins again. *See, e.g.*, Bridge 19:45-54. As described by the present Application, allocation and deallocation of disk space is a problem the present invention is designed to avoid. *See* Application, ¶¶ [0004], [0026]-[0027]. Further, the amended

claims clearly provide that no allocation of a storage region for the first operation occurs until after a determination is made of available space for the remaining operations.

Applicants submit that the cited sections of Vishlitzky fail to provide this missing disclosure. The Office Action only cites Vishlitzky for the purported proposition that Vishlitzky “teaches of a mirrored set, mirroring data from one logical volume to another.” Office Action, p.3 (citing Vishlitzky 6:25-40). The Office Action does not cite Vishlitzky for any proposition related to allocation of space or checking for available space prior to allocation. *See id.*

Applicants also respectfully submit that the cited sections of Soejima cannot be combined with Bridge to achieve the current claims. The Office Action cites to Soejima as purportedly providing the teaching of “allocating the first storage region for the first operation if said determining determines that each of the remaining requirements can be satisfied.” Office Action, p.4. But, as stated above, one would not be motivated to combine Soejima with Bridge because the cited section of Bridge requires the allocation of the primary parity extent before performing the disclosed determination of space on the full mirror partners. To combine Bridge with any reference that purportedly does not also require such allocation would be contrary to the teachings of Bridge and would render the system taught by Bridge inoperative. It is impermissible to combine references under 35 U.S.C. § 103 when such a combination would render one of the references inoperative.

Even were it permissible to combine the teachings of Bridge with those of Soejima, Soejima is not designed to avoid the issues raised by the teachings of Bridge because the teachings of Soejima relate to a different, and unrelated, problem from those of Bridge. Bridge relates to purportedly finding mirror extent space. Soejima, on the

other hand, relates to making sure that performance of other, pre-existing data volumes, is not adversely affected by creation of an additional volume. *See, e.g.,* Soejima ¶¶ [0015]-[0016]. Soejima finds space for the additional volume and then determines whether performance of other volumes is affected. Soejima is not concerned with mirrors (as discussed in Bridge) or other operations to be performed (as discussed in the present Application). Further, the section of Soejima cited for the claimed identification only relates to the one volume Soejima is purportedly creating and not to all other operations, as claimed. Therefore, Soejima fails to provide the missing disclosure for which it is cited.

For at least these reasons, Applicants submit that neither Vishlitzky nor Bridge nor Soejima, alone or in combination, teach all the limitations of independent Claims 1 and 13, and all claims depending therefrom, and that these claims are in condition for allowance. Applicants therefore respectfully request the Examiner's reconsideration and withdrawal of the rejections to these claims and an indication of the allowability of same.

CONCLUSION

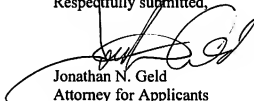
In view of the amendments and remarks set forth herein, the application and the claims therein are believed to be in condition for allowance without any further examination and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5090.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Applicant hereby petitions for such extensions.

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Applicant also hereby authorizes that any fees due for such extensions or any other fee associated with this submission, as specified in 37 C.F.R. § 1.16 or § 1.17, be charged to deposit account 502306.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Jonathan N. Geld', is written over the typed name and contact information.

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